MEDICINE TODAY

Current comment on medical progress, discussion of selected topics from recent books or periodic literature, by contributing members. Every member of the California Medical Association is invited to submit discussion suitable for publication in this department. No discussion should be over five hundred words in length.

Urology

Experimental Perfusion of the Frog's Kidney.—In view of the very valuable and interesting studies of Richards and co-workers in this country with the frog's kidney, some recent studies by Hartwich[1] are of interest. When the pressure of a Ringer's solution perfused through an isolated frog's kidney is raised, there is an increase in the amount of urine secreted but this is not always proportional. When the iliac artery is ligated, the amount of urine is greater but the flow less than when open, a condition that is explained by the fall in the pressure in the aorta and not by a reabsorption in the tubular cells. The perfusion pressure by way of the portal vein must be raised to about 8 to 10 centimeters before urine is secreted, which is then due to the backflow through the anastomotic vessels of the tubules to the glomeruli. The chlorids of the urine were found to be less than of the fluid perfused and the urine is sugar-free so long as the sugar percentage in the perfusion fluid is not above 0.05 to 0.06 per cent. And Hartwich concludes that this result is due to the low permeability of the kidney filter and not to reabsorption of sugar. Increasing the acidity promotes the rate of perfusion and secretion, whereas changing the hydrogen ion concentration towards the alkaline side diminishes both. Hypertonic perfusion fluids diminish perfusion and secretion, whereas hypotonic fluids increase both. Increase of the calcium ions increases the perfusion rate and amount of urine but, if the increase is great, then urine secretion stops altogether. Grape sugar in different concentrations, as well as other kinds, has no action upon the perfusion rate or diuresis of the isolated frog's kidney. Magnesium and sodium sulphate in certain concentrations slow the perfusion rate and increase the amount of urine. It was found that a low concentration with sodium sulphate diminished the rate of flow and secretion, and magnesium sulphate was active only when the iliac artery was tied. The action failed with an open artery because of the antagonistic calcium salts transported in the kidney. In no experiment was a diuretic action noted except when there was a corresponding change of the rate of flow, so that it is concluded that secretion of the urine is dependent to a high degree upon the rate of blood flow through the kidney.

Perfusion with a caffein solution of about 1:250,000 with the iliac artery tied off increased the rate of flow and secretion. With open vessels the amount of urine was proportional to the increased flow. With high caffein concentrations, the diuresis lasted longer than the increase of perfusion rate. The effect of caffein did not wear off with repeated use, and its different effects were more or less proportional to the size of the dose used. Theophyllin gave results similar to caffein. Urea solutions of 1:100 to 1:500 increased the rate of flow and the amount of urine and the increased secretion never outlasted the increased perfusion rate. Urea diuresis, therefore, seemed wholly due to the result of effect on the blood vessels. Perfusion with sublimate and novasurol solutions increased urinary flow, which to some extent was independent of the rate of perfusion. Cadmiumchlorid, closely allied in its action to quicksilver, usually produced an increase which, in contrast to quicksilver diuresis, was usually parallel to the rate of perfusion. Strophanthin solutions increased the rate of flow and produced diuresis, whereas perfusion with atropin and pilocarpin had no effect. Phloridzin in concentrations of 1:50,000 to 1:5000 produced diffusion and in still higher amounts increased secretion. In concentrations of 1:3000 there was a diminished secretion and, under certain conditions, complete cessation of the formation of urine. Glycosuria appeared even in concentrations of 1:10 million up to 1:1 million. Glycosuria of phloridzin and diuresis have no interrelation as the glycosuria seems undoubtedly due to an increased permeability of the glomerulus. Chlorid secretion seemed in no way affected by phloridzin.

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REFERENCE

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Medicine

Pituitary Tumors and Diabetes Insipidus.—While diabetes insipidus is not a common condition, it is occasionally met with in general practice and in some of the early or less marked cases it may be easily overlooked. The condition is characterized by the excretion of large amounts of watery but otherwise normal urine associated with excessive thirst. The patient may present no other symptoms and be apparently in excellent general health.

All the etiological factors in the production of diabetes insipidus are not clear, particularly in

the so-called *primary* or *idiopathic* cases which seem to be of the nature of an hereditary defect transmitted by parent to offspring. In many instances, however, it is due to a lesion affecting the floor of the third ventricle about the stalk of the pituitary body (*secondary diabetes insipidus*). It may be produced by fractures of the base of the skull, primary or secondary ventricular hemorrhage, or by tumors of the optic chiasm, the pituitary, or of the structures forming the walls of the third ventricle. It may be produced in experimental animals by puncture of the parainfundibular region, which suggests that in this situation there is a center which controls the excretion of fluid by the kidneys.

In *pituitary adenomas,* diabetes insipidus is not a common symptom until late in the course of the disease when extension of the tumor through the diaphragma sellae may result in a disturbance of the parainfundibular region. It may also occur after operative procedures, possibly due to trauma incident to the attempted extirpation of the tumor. In *craniopharyngeal pouch cysts* its appearance is earlier and more characteristic, due to the distortion of the floor of the third ventricle incident to the upward extension of the tumor. It may be the only symptom present for some time. When associated with failing vision, dwarfism, and increasing adiposity in a child, this tumor should be kept in mind as the possible cause. *Tumors of the optic chiasm,* originating just anterior to the pituitary stalk, are also a cause of the condition. Symptoms of pituitary hypoactivity may not be marked, progressive loss of vision associated with primary optic atrophy being more characteristic.

In view of the frequent association of diabetes insipidus with tumors in the region, it is important to investigate each case carefully in the attempt to determine its exact cause. A radiographic study of the skull should be made in each instance with particular attention to possible bony changes in the region of the sella or the presence of calcareous particles within or above it. Diminished visual acuity and alterations in the perimetric fields should be looked for. Ophthalmoscopic examination in tumor cases will usually show some degree of primary optic atrophy. The attainment of symptomatic relief by the use of nasal packs moistened with pituitrin can in no sense replace the examination for the etiological factor.

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Dermatology

Blood Chemistry in Diseases of the Skin.—Empirical observation has long ago established the importance of metabolic factors in the causation of systemic dermatoses, such as eczema, psoriasis, acne, seborrhea, pruritus, etc. Dietetic restrictions of various groups of foods, sugars, carbohydrates and fats or proteids were practiced at random in a purely experimental fashion. Only recently systematic study of blood chemistry in systemic dermatoses has been taken up by various observers. The most comprehensive and outstanding contribution has been recently reported by J. Schamberg [1] of Philadelphia. Coming from so competent and conservative an observer with unexcelled facilities for research, this study is of particular interest and informative value.

Schamberg reports results of blood chemistry study of more than 1000 cases of systemic dermatoses of which 875 cases furnished complete blood study.

The blood was taken always in the forenoon, within one to four hours after breakfast. One of the most important deductions drawn by Schamberg from this study with respect to the nitrogen constituents of blood is that it is perhaps unscientific to inquire what is the maximum normal of nonprotein nitrogen, urea nitrogen or uric acid in the blood, but rather what is normal for a male or female of a given age. Speaking generally, men between the age of twenty and seventy have an average about 0.6 milligram more uric acid per hundred cubic centimeters than women. The study shows a steady rise in uric acid, uria nitrogen, and nonprotein nitrogen from the third to the eighth decade of life.

Whereas at the age of thirty the average uric acid for men is about 3.5 milligrams, the urea nitrogen between 15 and 16 milligrams and nonprotein nitrogen 33 milligrams, at the age of eighty the respective figures were 4.2, 20, and 38 milligrams. In contrast to the prevailing ideas and several recent publications, Schamberg found only a small number of instances where eczema was caused by a pathologic increase of dextrose in the blood.

Moderate increases of blood sugar were often due to the fact that the blood was taken too soon after breakfast. On reëxamination after fasting, the blood was usually normal.

On the other hand, an excess of nonprotein nitrogen, urea nitrogen, and uric acid was distinctly more common in eczema than in other dermatoses, with the exception of generalized pruritus. The maximum normal of nonprotein nitrogen in the blood is 40 milligrams per 100 cubic centimeters of blood. Twenty-two and six-tenths per cent of 452 cases of eczema had 40 milligrams or more. The cases of general pruritus showed 36 per cent.

Maximum normal amount of blood urea nitrogen is 20 milligrams per 100 cubic centimeters of blood. Twenty-one per cent of eczema cases showed 20 milligrams or more of urea nitrogen in the blood. In cases of generalized pruritus the proportion was 44.4 per cent.

There is some difference of opinion as to the maximum of normal amount of uric acid in the blood. Of 455 cases of eczema 217 or 47.7 per cent showed 4 milligrams or more per 100 cubic centimeters of blood. The highest amount found was 7.6 milligrams. Of 143 cases of pruritus fifty-nine, or 41.3 per cent, showed an excess;